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A PILOT CENTER FOR EDUCATIONAL POLICY RESEARCH. FINAL REPORT--PART I.

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THE PILOT CENTER FOR EDUCATIONAL POLICY RESEARCH, OPERATED BY THE SYSTEM DEVELOPMENT CORPORATION FROM JUNE 1, 1967, THROUGH FEBRUARY 29, 1968, HAD THREE OBJECTIVES--(1) TO INVESTIGATE, ANALYZE, AND EXPERIMENT WITH METHODS, PROCEDURES, AND TOOLS FOR STUDYING THE FUTURE AS IT COULD AFFECT EDUCATION IN THE UNITED STATES, (2) TO FORECAST POSSIBLE ROLES IN EDUCATION IN 1988 OF TEACHERS, COUNSELORS, AND ADMINISTRATORS AND TO CONSIDER POSSIBLE NEW EDUCATIONAL FUNCTIONS INVOLVING NEW VARIETIES OF EDUCATORS, AND (3) TO DEVELOP A STRATEGY, A PHILOSOPHY, AND AN ORGANIZATIONAL DESIGN FOR AN OPERATIONAL CENTER FOR THE INVENTING OF EDUCATIONAL FUTURES COVERING A WIDE SPECTRUM OF CONSIDERATIONS THROUGH AN EXTENDED PERIOD IN THE FUTURE. SEVEN PROJECTS WERE UNDERTAKEN, EACH COVERING A DIFFERENT SUBJECT RELATED TO FUTURE EDUCATIONAL POLICY MAKING--(1) A SURVEY AND EVALUATION OF THE FORECASTING STATE OF THE ART, (2) A STUDY OF CONTEXTUAL MAPPING, (3) A SURVEY OF MATHEMATICAL MODELS, (4) A STUDY OF EDUCATIONAL "WANTS," (5) A STUDY OF FUTURE EDUCATION ROLES, (6) THE DEVELOPMENT OF SEMIAUTOMATED DATA BASES, AND (7) EXPERIMENTS IN INTERACTION. THE RESULTS OF THESE SEVEN PROJECTS LED TO RECOMMENDATIONS FOR THE FORMATION OF A SUITABLE ORGANIZATION AND THE EXECUTION OF SPECIFIC ACTIVITIES FOR AN OPERATIONAL EDUCATIONAL POLICY RESEARCH CENTER THAT IS EXPECTED TO CHANGE AND EVOLVE IN RESPONSE TO NEW AND CHANGING REQUIREMENTS. (HW)

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FINAL REPORT: PART I

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A PILOT CENTER FOR EDUCATIONAL POLICY RESEARCH

PART I

February 1968

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

A PILOT CENTER
FOR
EDUCATIONAL POLICY RESEARCH

PART I

Project No. 7-1003
Contract No. OEC 1-7-071003-4275

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February 1968

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System Development Corporation

Santa Monica, California

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I. INTRODUCTION

A. Background

In January 1967, the Bureau of Research of the United States Office of Education made the following announcement:

> The Bureau of Research of the U.S. Office of Education is planning to launch a new extra-mural research program aimed at providing information to educational policy makers. The work will eventually be accomplished by two or more interdisciplinary, systems oriented research centers whose primary task will be to analyze future educational needs and resources and, in light of these analyses, provide policy makers with relevant information and techniques for decision making. They will be "inventing" alternative futures and mapping out the paths necessary to reach them.
>
> Prior to establishing operational centers the Bureau intends to fund up to five pilot centers on short-term (9 month) grants. These pilot centers will have the dual task of (a) undertaking a limited number of policy studies and (b) presenting a design for the creation of an operational center (3).

The Bureau of Research described the need for such a program and its principal focus in part in the following terms:

> Modern society is becoming increasingly complex and its various components are becoming more inter-related. The educational system is a case in point. Its relevance to numerous societal needs and populations is becoming more obvious; it is increasingly asked to carry the burdens of society and to solve its problems. In fact, it may be said that education is taking on a totally new role, one which goes far beyond the teaching of skills and includes the preparation for a changing world, the basis for national prestige, and the solution of a long standing racial problem. It is simultaneously faced with increased enrollments, rising costs, public discontent, and totally new instructional technologies.
>
> It is clear that educators need information which will assist them in dealing with the emerging new interfaces between education and society....
>
> In general, the centers will address themselves to four major questions:
>
> 1. What will the social functions of the school be in the future and how might the school begin preparing for them now?
>
> 2. What ought the curricular objectives now and in the future be?

3. What technologies will be available to the school of the future and what are their implications for the school today?

4. What economic and political resources will the schools need in the future and how might that affect their planning at present?

Or, to put it in broader terms, what are the policy implications of the revolutions in cybernetics, population growth, civil rights, urbanization, segregation, sex education, communication, information retrieval, industrial organization, automation, material abundance, nuclear weaponry, space exploration, interpersonal relations, etc.? (3)

The five pilot centers were established in June 1967. This report records the activities, results and recommendations of the center operated by System Development Corporation (SDC) from June 1, 1967 to February 29, 1968.

B. Conceptual Approach

In approaching the problem of carrying on a Pilot Center whose tenure might be short-term but whose output should have values that were long-term, SDC based its plans on a philosophy and a set of considerations that are summarized below.

There are three basic reasons why studies of the future are critical in the formulation of educational policy (1,6,11). The first two are closely related and pertain to leadership. Strong leadership can be provided by educational policy makers on a rational basis only if, first, there are preferable futures to point toward as long-range educational goals; and, second, there is sufficient evidence to support arguments for selected educational policies. The third reason is that in the absence of a concept of the future as a goal, education may be ultimately dominated by technological or other incidental values. Help in the development of objectives, together with understanding of how they may be attained, is one function in which policy research centers may serve those with policy responsibilities in education.

All too frequently in contemporary society, the procedures and traditions of the past, however salutary they may have been, do not provide satisfactory guides to the present. Moreover, they may be quite useless when one looks to the future. This is the modern decision maker's dilemma: the complexities of the contemporary scene force him to try to anticipate the future at the same time that attempting to do so is becoming more and more difficult.

The dilemma is even more pronounced for the educator than it is for the military commander or the corporation executive. Leaders in noneducational areas may be required to look ahead only five years, or perhaps ten. The educator, by the very nature of his task, must be oriented to a longer-range future. The educational program he is attempting to design and finance for today must produce adults prepared to function appropriately in a world many years from now.

The problem of the educational policy maker is compounded in that the long-range future of education with which he must be concerned is embedded in an extraordinary complex of interdependent institutions, all of which, like education itself, are undergoing change. One cannot plan intelligently for, say, the school of the future,without taking into consideration the major transformations occurring in society: the population explosion, urbanization, the civil rights movement, the impact of automation on traditional concepts of work and leisure, the computer revolution and the information explosion, and the growing competition for the nation's tax dollars. All of these changes have significant implications for education.

In spite of the difficulties, the need is obvious for educational policy makers at all levels to visualize a range of alternative and possible futures for education in society. If policy makers can examine the range of possibilities--if they have even tentative answers to such questions as "What might happen?" "What might happen if?" "What must be done in order to make it happen?"--then it becomes possible for them to act in advance of events to influence the evolution of education so that it conforms more closely than would otherwise be the case to desired objectives and ideals.

Idle speculation about the future would serve no constructive purpose. What is required is creative, responsible conjecture. Ways must be found to combine the knowledge of the imaginative thinker and the specialized expert in symbiotic relationships with the experience of the politician and the policy maker, to the end that educational policy making can be rational, farsighted, cohesive, and effective.

There should be no illusions, however, about the difficulties inherent in a subject as formidable as constructive and systematic intervention in the future of social phenomena. It is not a science but an art (5).

The importance of the forecasting art is that imaginative constructs of future possibilities serve as guides to action in the present. Action today is made meaningful in terms of some identified goal perceived for the future. One saves money for a long-planned trip; or one works hard in medical college to become a doctor. Without goals or images of the future, there is no possibility of consistent, coherent, systematic activity. For these reasons there is no question of whether or not one should or can create images of the future; the question is how to do so--how to forecast, and how to decide which of several possibilities are most probable, desirable, dangerous, or difficult of accomplishment.

It would be an unfortunate mistake to think about imagining the future as if it were a matter of making precise predictions of future events, since this cannot be done. It is important to face the fact that prediction is not the objective of the art of conjecture. Concepts of the future confront the decision maker with a range of alternative possibilities, however unlikely they may be a priori. They may cause him to reexamine his assumptions, to clarify or adjust his long-range objectives, and to reconsider his current policies and programs. The value of a forecast is that it is a stimulus to action. A moment's reflection indicates this must be so, for if we could actually predict the future, this would mean that the future is determined so that we could do nothing about it one way or the other.

The most commonly used method or procedure in the study of the future is the extrapolation of current trends. This method is recognized to be very useful, although crude; it is founded on the assumption that the behavior of the phenomenon being studied will be in some sense the same in the future as it has been in the past.

There is another method of forecasting that deserves equal consideration but that arrives at its results not through logical processes, but rather through creative leaps of the imagination. For the present purpose, this may be described as "intuitive" forecasting. This is the forecasting of artists, writers, inventors, and prophets. Such forecasting produces visions of the future that may take little account of what probably will occur, but rather of what might occur. Such visions cannot necessarily be explained or arrived at rationally, but, over and over in the history of the world, they have turned out to be more useful than many logical forecasts.

C. Objectives

It was recognized that the SDC Pilot Center would have to be selective in its work. It was therefore determined to confine the effort to the following three limited but significant objectives:

1. To investigate, analyze, and experiment with methods, procedures, and tools for studying the future as it could affect education in the United States.

2. To forecast ("conjecture") possible roles in education in 1988 of teachers, counselors, and administrators (hereafter referred to collectively as educators) and to consider possible new educational functions involving new varieties of "educators." (This date, twenty years from the planned establishment of the operational centers, was selected as being useful to educational policy makers concerned with the long-range future, as distinct from intermediate-term program planning, yet close enough in time so that credible forecasts could be meaningfully related to the present.)

3. To develop a strategy, a philosophy, and an organizational design for an operational center for the inventing of educational futures covering a wide spectrum of considerations through an extended period in the future.

The first objective was selected because the many methods that have been developed in the past for determining the range of alternative futures have not been systematically evaluated for their usefulness in helping educators make more soundly based policy decisions. It was by no means clear what methods or combinations of methods would be most appropriate for this task.

It was therefore intended that the SDC Pilot Center would concentrate first upon examining selected methods and approaches for systematically visualizing future conditions and would evaluate them for applicability to education. The thrust of this effort would be toward developing an approach, by selecting and combining methods and tools, which would help form and would be consistent with the philosophy, strategy, and design concept of an operational center for educational policy research.

The substantive area of education that SDC proposed to investigate through applying the method or methods selected was the probable roles of educators in 1988. Such roles are central both to the educational process and to education as an institution. Educational policy making at all levels is concerned with them. If the roles of educators were to change drastically during the next twenty years, as many experts predict, this change would require and imply important policy decisions affecting broad areas of education.

The selection of the roles of educators as the substantive area for study in the context of the future led logically to two additional steps. To understand and conceptualize alternative roles of educators as they might exist in 1988, the investigators must understand the school environment in which the roles are embedded. (The use of the concept "school" in this context is a matter of convenience only. The school of today may be completely transformed in the next 20 years). And to understand the school environment, one must comprehend the society in which the school is a functioning component. Hence it was planned to study for 1988 some of the alternative possibilities of (a) the nature of the social environment, (b) the nature of the school environment, (c) some alternatives to the school as environments for learning, and consequently, (d) some needed and possible roles for educators.

D. Center Organization

To realize the chosen objectives and to permit the carrying on of the kinds of studies that would contribute most effectively to their achievement, a form of organization was devised that took full advantage of the Corporation's versatility and wide experience, and that also brought to the support of the enterprise many knowledgeable minds from the community at large. A major consideration in designing this organization was to provide for flexibility and the possibility of experimenting with several different structural patterns as the work proceeded.

The organization was made up of three major elements: an interdisciplinary core staff of five persons including the Director and Associate Director, an SDC Consulting Panel made up of senior professionals from within the Corporation,and a Community Resources Panel composed of knowledgeable representatives from eight sectors of the community at large. Figure 1 shows in diagrammatic form the way in which the Corporate Management and these three elements were related. This basic arrangement was maintained throughout the project.

The work of the Pilot Center started promptly on June 1, 1967. As the work progressed, new fields for investigation suggested themselves, and opportunities afforded by the availability of people with special training and experience were turned to practical account. As a result, the original program was widened and deepened. It was believed that, to be effective, the Center should be ready, willing and able to evolve in the light of its own experience. Three examples of the evolution that actually took place may be cited:

1. Because it was recognized that the future is not something that should be accepted passively, nor be determined for all by the desires of the few, a new study to explore the educational "wants" or "future-preferences" of relevant groups and organizations was added.

2. Because of an awareness of the extreme complexity of the matters being considered, the survey of methods was extended to include a close examination of mathematical and computer-based models of processes in education to determine their potential usefulness for planning and decision-making in education.

3. Because of the evidently controversial nature of the future, a set of educational issues was identified that policy makers must face and resolve in the years immediately ahead. It was believed that these issues clearly warranted further study.

Throughout the nine months of operation, the experience and insights gained were constantly related to the problem of designing a fully operational center for educational policy research. The studies conducted, the methods employed and the findings made in the specific areas discussed in the following sections,were viewed not only as efforts to gain substantive information, but as experiments in mapping the terrain of educational policy and in testing hypotheses relating to the design of a much larger and more sustained effort.

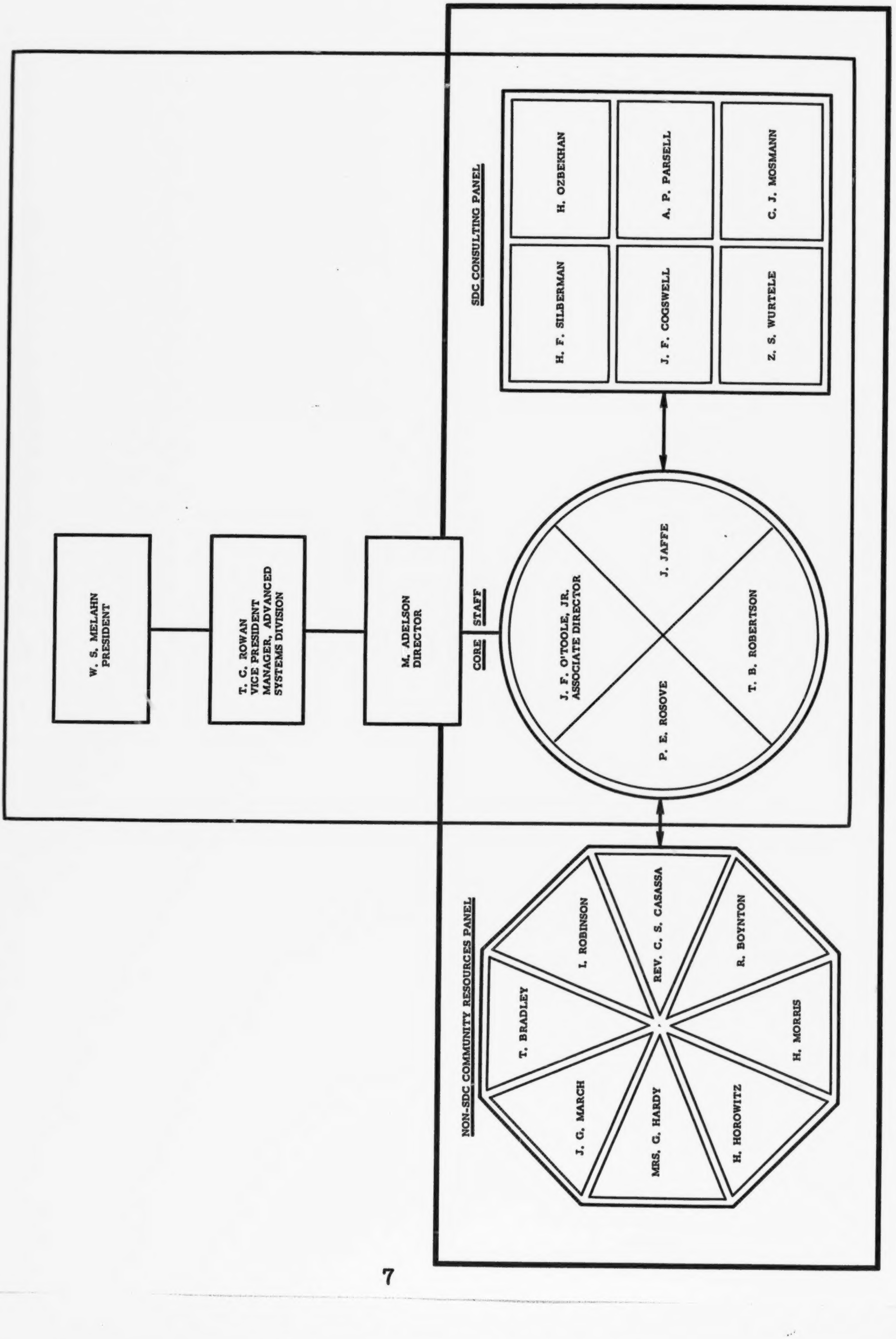
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FIGURE 1. PILOT CENTER ORGANIZATION

II. METHODS

The Pilot Center program consisted of seven projects, related in the sense that they all contributed to the Center's objectives, but different from each other in the area covered and the particular techniques employed. This was, of course, consistent with the objective of investigating and experimenting with a variety of methods for studying the future.

A. Survey and Evaluation of the Forecasting State of the Art

A full report of this study is included as Appendix A. The purpose of the study was to conduct a provisional survey of existing forecasting methods and attempt to determine their relevance and usefulness for supporting future-oriented policy formulation and decision making in the field of education. Thus, the primary concern was not with methodology as such, but with its application.

None of the methods currently used in forecasting has the sort of precision or verifiability that we associate with laboratory experiments in physics or chemistry. Even in the field of demography where forecasting methods are relatively sophisticated, different results are obtained in time-series extrapolations of population growth, since the scientists involved employ different assumptions. Thus, it was necessary to recognize the limitations of all forecasting methods, while accepting the fact that the future can be usefully studied nevertheless.

The conceptual approach for this study was based on a set of propositions concerning the functions to be carried on by a fully operational center for educational policy research. Briefly, it was postulated that such a center should have the capability to provide for at least the following major functions or activities:

1. Generate alternative futures, both extrapolative and normative (what might be and what should be).

2. Explore alternative pathways to desirable futures.

3. Explore the alternative consequences of policy decisions.

4. Achieve, via public dialogue, a selection of preferred futures and pathways to them.

5. Conduct training for policy makers and others in the study of the future and in decision making about the future.

6. Conduct research on selected problems pertaining to group decision processes, forecasting methodology, and the future of education.

7. Identify information needs.

This list of functions was considered to be highly tentative and incomplete, but useful for developing an approach to the study of the future in education.

A preliminary survey of attempts to conjecture about the future quickly revealed that there is no recognized science or field of futurology. Rather, there appeared to be almost as many varieties in the type of approach to the subject as there are active futurists. It was found that forecasting efforts vary extensively with regard to purposes or objectives, theoretical assumptions, concepts employed, degree of concern for methodological rigor, substantive areas of interest, the use of data, the time period considered, etc. There is no widely accepted classification scheme for forecasting methods. The problem is further confounded by the lack of a standardized language by means of which "futurists" can communicate with one another. There is not even agreement as to what constitutes a "method" or what is meant by a "forecast."

The first step taken, therefore, was to develop working definitions of these latter two concepts, and to identify a set of forecasting methods that were in consonance with them. Twenty-one methods for conjecturing about the future and for contributing to the attainment of a desired future were thus identified and defined. This set did not by any means exhaust the number of possible methods, but it did represent a set that was readily identifiable in the time available and that appeared to encompass the major methods recognized in the various sources that were examined. As an outcome of this effort, the following methods were isolated, examined and defined:

Brainstorming
Delphi Technique
Expert Opinion
Literary Fiction
Scenarios
Historical Analogy
Historical Sequences
Content Analysis
Social Accounting
Primary Determinant
Time-Series Extrapolation
Contextual Mapping
Morphological Analysis
Relevance Trees
Decision Matrices
Deterministic Models
Probabilistic Models
Gaming
Operational Simulation
Benefit-Cost Analysis
Input-Output Tables

The next step was to evaluate the potential of each of these methods for the support of the seven operational center functions previously established. This was done by evaluating each method subjectively along a five-point scale from "high" potential utility to "none." It was then possible to develop a matrix showing the estimated potential utility of each method in relation to each function. By assigning numerical values to each position on the scale, all methods could be rank-ordered in terms of their utility in supporting each function, and this was done for the Center function of "stimulating public dialogue." In addition, each method could be, and was, assigned a utility score that was the sum of the presumed utilities of the method for the combined set of functions (See Initial Evaluation Matrix, Appendix A).

B. The Study of Contextual Mapping

Reports of this study are given in Appendices B and E. The idea that the method of contextual mapping would be a very useful approach, with many long-range potentials, emerged first out of the review of this method by Erich Jantsch undertaken as part of the study of the forecasting state of the art (8).

The decision to make use of a contextual map as a device for coming to grips with the substantive problems of social trends, the future of education, and the possible roles of educators in 1988 was reached as the staff of the Center acquired some first-hand knowledge of the forecasting state of the art, as they studied the documents of the Hudson Institute, as they read the literature dealing with social trends, and as they attempted to cope with what they regarded as a basic issue: how to use the forecasting state of the art in the context of a public debate, in a public forum or "educational politeum."

This growing belief in the utility of the method received additional impetus following a visit to SDC by Erich Jantsch on October 24, when the staff had the opportunity to show the map layout to him and review with him its possible uses for educational policy making.

A contextual map may be defined as "a graphic display of the logical and causal dependencies of functionally related phenomena." The map developed by the Center's staff is a two-dimensional matrix containing 36 cells (see Figure 1, Appendix B). The rows of the matrix represent functionally distinctive phenomena--the basic, long-term trends of Western civilization. These trends were adapted from the work of the Hudson Institute (9). Five trends were selected since it appeared that they would be particularly rich in possible implications for education. The trends are:

1. Increasingly sensate, empirical, humanistic, pragmatic, uilitarian culture.

2. Transitional, mass-consumption society characterized by higher GNP and personal incomes, affluence (among the better educated).

3. Worldwide industrialization and modernization.

4. Institutionalization of change, especially through research, development, innovation and organized diffusion.

5. Accumulation of scientific and technological knowledge.

For the sake of facilitating the mapping of functionally related phenomena, the trends were grouped into three major sectors and subdivided into a total of six subsectors as rows of the matrix. The subsectors used were: cultural, sociocultural, economic-national, economic-international, science and technology-organization, and science and technology-information.

The horizontal axis of the matrix was divided into six columns that were designed to show the logical and causal sequences of events, trends, conditions, and processes dependent upon the basic, long-term trends. The six columns included:

1. Major Subtrends
2. Social and Technical Implications
3. Implications for Education
4. Educational Functions
5. Possible Future Roles (for educators)
6. Major Issues

The selection of these column headings reflected both a logical order and the substantive concerns of the SDC Pilot Center effort, i.e, the implications of social and technical trends for society, education, and the roles of educators.

The contextual map as finally developed was a wall display, 98 inches wide by 50 inches high, organized as a matrix of 36 cells each of which measured 14.5 inches by 7.5 inches.

Trends, events, conditions, and processes were represented in each cell of the matrix by "entries." Each entry was a set of words enclosed in a rectangular box within a matrix cell and functionally related entries were identified by the same numeral across an entire row of the map. There was a total of 18 functional sets, three in each of the six rows. Relations among entries were indicated by various kinds of lines connecting them and by letter and number codes associated with them. Such identifications made easy reference to each entry possible, and also provided a basis for associating an entry with other data or information available to the Center, such as the automated bibliographic data base, demographic computer models, and statistical data available in literature sources.

It should be pointed out that the actual map in use at SDC was color-coded. For example, red tacks were used for pinning all critical entries to the map; blue tape was used to show logical and causal dependencies. A full presentation of the format and entries on the map is included as Attachment A of Appendix E. The figures of Appendix E show the structural features of the actual map, but have been changed as described above for the purposes of reproduction in black and white.

The map continued to be elaborated and used in the tracing of relationships and dependencies, conceptualizing and relating educator roles, and identifying educational issues until the end of the Center program.

C. The Survey of Mathematical Models

A complete report of this survey is given in Appendix C.

It was the purpose of the project to describe, and to some extent evaluate for the operational center program, some of the computer programmed mathematical models that have been used for educational planning.

Models may be classified according to subject rather than according to structure, as follows:

1. Models representing the educational system or some of its components.
2. Models of the economy in which education is one of the components.
3. Models of the technology of the educational process.

Models in the first category that have aroused considerable interest in recent years are demographic models for projecting student or teacher populations. Large-scale computerized models of this form were developed by the U.S. Office of Education and by the British Department of Education and Science (2,10). This category includes other demographic models based upon trend extrapolations, extensions of demographic models in which physical requirements (teachers, capital goods, materials) are projected on the basis of past student enrollments, and cost-benefit models. Also included are models of individual school activities that project student enrollments in alternative course sequences and the consequent utilizations of teachers' time, equipment, etc. (4).

Models of the second type are considerably more difficult to develop, for in addition to the structure of the educational system, structures of other sectors of the economy must be represented as well as the interfaces among these sectors. Work along these lines relies upon a theoretical basis provided by the economist, T. Schultz. (12,13,14) The educational sector is viewed as a producing sector with inputs (e.g., teachers, buildings, books) and certain outputs. One of the first questions to be resolved is how to measure educational outputs; probably the simplest definition, in terms of available statistics, is the numbers of students at different educational levels.

The third category includes learning models and, more generally, stochastic models of individual behavior that represent processes of becoming educated. Models in this category were beyond the scope of this survey for they were considered tools for educational or scientific research rather than for educational planning.

The survey included mathematical models developed in the United States, Great Britain, the Netherlands, France, Norway, Sweden, Australia, Spain, Turkey, and Greece. In addition, the work conducted under the encouragement of the Organisation for Economic Cooperation and Development (OECD) and the United Nations Educational Scientific and Cultural Organization (UNESCO) was reviewed. The most serious gap in the survey was the necessary ommission of planning models of the Soviet Union and Soviet Satellite countries.

In all, some eighteen models were identified and described under the following headings:

1. Demographic Models based upon transition proportions (Macro-Models).
2. Demographic Models based upon transition proportions (Micro-Models).
3. Demographic Models based upon simple trend extrapolation.
4. Cost-Benefit Models.
5. Models of school activities.
6. More extensive models with demographic, economic, and other components.
7. Models of the economy with the educational system as a component.

D. The Study of Educational "Wants"

A full report of this study is given in Appendix D. The objectives of the study were:

1. To experiment with methods for ascertaining group educational "wants" as a basis for more extensive research in this field.

2. To ascertain what a selected number of groups within the United States want from future educational programs.

3. To examine the extent to which the several groups agree or disagree with respect to what they want.

4. To expose potential issues raised by the impacts of these wants upon current trends affecting education.

The project developed out of early discussions by the Center's staff and the SDC panel of senior consultants. These led to the conviction that what the public wants for the future helps to determine the future. Thus it was assumed that, as changing times and events keep presenting new problems and new challenges, one is forced to choose between two or more courses of future action. Each such choice determines to some degree the events that will follow, and thereby helps to shape the future that will eventually come to pass. Each choice also tends to sacrifice other futures that may have been possible. Each decision is influenced by the things the chooser wants for the future, by his hopes, values, and aspirations.

In the case of educational policy makers, however, the things wanted are seldom entirely personal. Rather, they tend to reflect the hopes, values and aspirations of some constituency, some group of citizens for whom the policy maker acts. Hence, what people in general want influences choices of educational policy and action. The public shares in making educational policy--even though the ways may seem obscure and the means uncertain. However, educational wants are not now and probably never will be uniform throughout the country. They appear to differ by class, occupation, ethnic group, region, political viewpoint, and other factors. These differences reflect differing group needs as well as differing values and aspirations stemming from the diverse backgrounds of the people of the United States. The diversity of wants has differing impacts upon policy decisions.

Although the original program for the SDC Pilot Center for educational policy research had not established a specific requirement for following up on this set of assumptions, it was decided that their importance justified an investment of effort in this field. Initial plans for this project called for the use of two approaches. The first was based on the "linking pin" concept under which the immediate resources of the Center were augmented with the help of friends and associates who could arrange meetings of relevant community groups at which future wants for education could be debated.

The second approach was based on a modification of the "Delphi technique" (7) which involved the selection of respondents according to the population groups that they represented (instead of according to their authority as experts in a particular field of knowledge) and an examination of systematic divergences as well as convergences of opinion within and among the several groups.

It was realized during the pilot phase that time and available resources would not permit sampling the many class, ethnic, economic, occupational, regional, political, and other groups in the United States in any systematic way. The best that could be attempted was a preliminary exploration of the wants of a small number of groups.

Constraints of time and resources also precluded the full use of mailed questionnaires commonly used in the Delphi technique. It was therefore planned to employ a Delphi-like structure in the conduct of one or two of the meetings. To aid in the selection of representative groups, a matrix arranged by level and sector divided the total population into twenty-six subpopulations of education "providers" and "users," and suggested organized groups that might be considered as representative of each subpopulation (See Figure 1, Appendix D).

During this preliminary exploration, the following four meetings were sponsored by the center's staff:

Community Resources Panel (Santa Monica)	Policy Makers and Educators
"Operation Bootstrap" (Los Angeles)	Representatives of the Black Community
System Development Corporation (Santa Monica)	Human Factors and Training Professionals
New School for Social Research (New York City)	Futurists, Writers, Educators

The first two and the last of these meetings were loosely structured; the third employed a very closely structured application of the Delphi technique. Tape recordings were made at all meetings, and these provided data upon which the findings were based.

E. The Study of Future Educator Roles

A full report of this study is provided in Appendix E.

In its simplest form, the methodological structure for this project is composed of three sequential steps: (a) extrapolation of selected aspects of the major long-term trends in Western civilization; (b) the logical derivation from the extrapolated trends of basic concepts which would serve as organizing principles for a possible future learning environment; and (c) the logical derivation of the possible roles of educators which would be compatible with the future learning environment.

The method of "contextual mapping" was used to extrapolate selected aspects of the major long-term trends. This method has been described above in subsection B. It was noted in that section that the selection of the column headings for the map matrix reflected both a logical order and the substantive concerns of the SDC Pilot Center with the implications of social and technical trends for education and the roles of educators.

One may ask, of course, what does contextual mapping reveal about the future roles of educators that other, more conventional methods do not? Is it worth the cost and effort? It was necessary to read through as much as time allowed of the literature on future educator roles to determine that, in fact, the method of contextual mapping contributed something unique. A comparison was made between the published literature dealing with possible future roles of educators and the results of the contextual mapping process. One significant result of this comparison demonstrated, in our opinion, the power of contextual mapping: the map, although it was a limited, experimental effort, contains 98 different possible future roles for educators and locates them in a logical and causal sequence of extrapolated events, processes, and conditions. In addition, as a by-product, 101 potential educational issues were identified.

The 98 roles which were identified suggested possibilities only. But roles are meaningful only within organizational contexts. It was necessary, therefore, to conjecture about the kind of learning environment which would be compatible with the trends extrapolated, by deriving from the extrapolated trends basic concepts which might serve as organizing principles for future learning environments. The next step was to design a role or roles which would be logically compatible with the possible future learning environments, the extrapolated trends, and the objectives of educators. It was decided to focus on the role of the "teacher" in depth rather than to attempt to deal in detail with all of the 98 roles identified. This decision was based on the fact that the concept of the "teacher" is the key generic role concept in today's education, the nature of the learning process, and the organization of learning environments. Any significant changes in the role of the "teacher" which might be conjectured for the future would have the most profound implications for educators.

F. The Development of Semiautomated Data Bases

A report of this project is given in Appendix F. The purpose of the project was to take the initial steps toward establishment of two computerized data bases for use by the center staff and by other users or visitors. The first was a "bibliography" data base, the second was a "methods" data base. The computer programs used to generate both were designed to operate within the System Development Corporation Time-Sharing System, in which several different computer programs can be operated more or less simultaneously under the control of an executive program. The system is especially advantageous when the programs require interaction with a user whose inputs can either be data or additional instructions. As far as the users are concerned, the processing is almost instantaneous, although each program in the loop may have a few hundred instructions executed during its turn in the computer.

Teletypewriters connected to the time-sharing computer (AN/FSQ-32) can be located almost any place. There are perhaps thirty scattered around SDC in Santa Monica, one at the University of California, Berkeley, one in SDC's Washington, D.C. office, and so on. A user at any of these locations can either compose his own program at the teletype, call for a program he has previously written and stored on magnetic tape at the computer facility, or call for one of the standard library programs. In short, time-sharing is a "mechanism" that allows relatively inexperienced people to use data processing facilities by interacting directly with their programs while the programs are in operation.

The LUCID library program used allows a user to define the types of data he will be using,then load the actual data into the computer for permanent storage on magnetic tape, and finally call selectively for the data from the data base and have it displayed.

In developing a Bibliography data base, it was recognized what was planned was well within the state of the art and that there are numerous other bibliographic services available, as for instance, from the Education Research Information Centers. However, the idea here was to develop not only a very specialized bibliography, but also a bibliographic do-it-yourself service with the content and process of policy research and education futures.

The first step in the above development was to define the following twenty-two items by which each entry (either an entire document or a discrete part of a document, such as a chapter of a book) could be described to the LUCID program.

Citation Number
Document Type
Senior Author
Other Authors
Title
Editor
Collection/Periodical Title
Publisher
Summary
Citation
Year
Subject Treatment
Quantitative Data
Bibliography
Forecasting Method
Method Description
Subject
Descriptors
Library
Serial Number
Comments
Special Title

These definitions then were used in filling out a work sheet for each book or other piece of bibliographic material to be entered into the data base. Approximately 120 such worksheets were prepared and entered via punched cards into the computer to produce a "test" data base. This data base then was used to demonstrate the utility of a computerized bibliography for the ongoing work of the center.

The Methods data base was a truly experimental data base that was defined and redefined a number of times. Entries in the base consisted of documented instances in which a forecasting method had been applied to the problem of predicting societal futures in general and educational futures specifically. Construction and manipulation of this data base was done in parallel with the center's study of forecasting methodology.

The work of defining the items describing each entry, of entering this information into the computer and of developing and completing worksheets was similar in every respect to that for the Bibliography data base. The items used were the following:

Serial Number
Method Names
Investigator(s)
Citation Number
Source Type
Acronym
Problem-Solving Stage
Forecast Type
Process Type
Application Area
Feedback
Timespan
Computerized
Transfer Dimension
Manpower Costs
Facility Cost
Equipment Costs
Comments

The development of this data base to the demonstration stage could not be completed due to lack of time. The planned linking together of this data base with the Bibliography data base could not be accomplished for the same reason.

G. Experiments in Interaction with Outside Interests

Early in the Pilot Center program it was recognized that attention to the design of an operational center (one of the three major objectives of the Pilot Center) would have to be moved up in the originally planned sequence of activities and be carried on concurrently with other tasks. To permit this, immediate attention was devoted to developing a philosophy for the design and operation of the center. Five of the elements of this philosophy had to do with interaction between the center and groups and individuals in the community at large:

1. The Pilot Center phase was not to be considered distinct and separate, but as a step in getting an operational center started. Thus, relatively less emphasis was to be placed on the short-term output, and relatively more on evolving the process whereby the center would serve its eventual constituency.

2. To be most effective, an operational center should augment its research activities with a set of other services that interpret relevant knowledge (generated internally and elsewhere), make it readily accessible, stimulate dialogue and controversy, and otherwise provide support to the organizations and groups at all levels and in all sectors of our society that play some part in policy and decision making in education.

3. A wide diversity of organizations and groups are capable of, and interested in, contributing to and benefitting from the prospective operational centers. Arrangements should be devised to facilitate both kinds of involvement. The formation of links to these organizations and groups should come early in the order of business for the center.

4. If policy is to be responsive to the needs and demands of the people, means should be devised for providing a voice to those people whose interests have not as yet been adequately institutionalized. The operational centers should not be responsive merely to the interests of the "educational establishment."

5. Past attempts at future-orientation have suffered from the lack of any clear understanding of the relationships among work done in various disciplines, organizations and locations. Thus, each effort has tended to start from scratch, and the needed capabilities have not been built up. A center should provide continuity and aggregation of capability. It should clearly be a center, not an "island of research."

In accordance with this philosophy, very extensive efforts were made to inform interested agencies, organizations, and individuals of the work of the center through the medium of visits, meetings and correspondence. Parallel efforts were designed to involve institutions and individuals in the work of the center by soliciting their advice and comment as to center activities and technical papers, by encouraging visitors to the center's facilities and by encouraging the submission of papers reflecting outside viewpoints (see Appendices H and I).

Individual interactions were too numerous to describe in detail. Representative groups and individuals and the media through which interaction took place are summarized below:

Education Commission of the States	Discussion and correspondence between center personnel and Commission staff members that were designed to (a) establish lines of communication and (b) exchange ideas about input and output relationships, and about possible services that an operational center might provide to the Commission.
Eight-State Project	Discussions and correspondence between center personnel and the Project Director and staff to (a) discuss possible contributions by the center's staff to the project's planned conference in May 1968, (b) establish lines of communication in order to reduce unnecessary duplication of effort between the Pilot Center and the project and (c) exchange information on the progress of programs, current activities, and plans for the future.

Multi-State Project: Comprehensive Planning in State Education Agencies	Transmission of center progress reports and staff working papers. Discussions between center personnel and the Project Director to exchange information on the purposes and progress of both projects, current activities and pilot studies under way, and plans for the future.
Community Resources Panel President, Loyola University President, Los Angeles City Board of Education Vice President, Bank of America Chairman, Department of City and Regional Planning, USC Representative of School of Law, UCLA	Conference at SDC to (a) explore the kind of center that would be of most use to policy makers and (b) canvas ideas of what is wanted for the future of education.
SDC Professionals Black Community Leaders Futurists and Educators	Meetings held in Santa Monica, Los Angeles and New York to canvas ideas of what various groups and individuals want for the future of education.
Southern California Industry-Education Council State Education Department of New York National Research Council, National Academy of Sciences National Industrial Conference Board	Attendance in an official capacity at conferences.

Dr. Charles Bruning, Upper Mid-West Regional Laboratory	Visits to the Center
Robert E. Stahl California Teachers Association	
David Evans and Charles S. Benson California State Committee on Public Education	
Erich Jantsch Organisation for Economic Cooperation and Development	
Stephen J. Knezevich American Association for School Administrators	
Alvin Toffler New School for Social Research	
Local Schools	Correspondence
Teachers	
State Departments of Education	
Colleges and Universities	
State Legislators	
Educational Researchers	
Private Citizens	

This program of interaction with potential "users" on the one hand and "contributors" on the other became an integral part of the evolving process of the Pilot Center and was maintained throughout the contract period.

III. RESULTS

The seven projects discussed above were elements of a single, coherent program, designed to link together education, policy making and the future, although each was unique in approach and substance with the result that the findings were mainly independent of each other. Collectively, the findings formed the main source of information and experience around which the SDC design for an operational center was developed.

A. Survey and Evaluation of the Forecasting State of the Art

The results of this survey can be summarized as follows:

1. Twenty-one different forecasting methods were identified and subjectively evaluated in relation to each of seven potential functions of an operational educational policy research center. Each method was also rated in terms of a "utility score" representing the sum of its presumed utility for all seven functions.

2. The evaluations were distributed on a matrix that permitted rank ordering by function (see Table 1, Appendix A). The rank ordering was actually carried out for the function of "Stimulating Public Dialogue."

3. The following points should be taken into account in future surveys of this kind:

   a. The ranking reflected the thinking of one individual who was not a specialist in methodology and who had only two months available for the study of the subject. It is possible that another investigator with a different background would have produced a different evaluation. A different group might also have derived a different set of presumed functions against which to evaluate the methods.

   b. Although the ranking indicated that some methods can be used for more purposes than others, it was considered that the ranking as derived from the utility score might be misleading in that the value of a method for one center function may be much greater (depending upon center objectives) than the total values of other methods for several functions.

   c. The value of a method may be altered when it is examined, not by itself, but as one step in a logically sequenced combination of methods.

4. The investigation of methods revealed that while the evaluation of individual methods is an important issue, a heretofore badly neglected problem is to determine which combination of methods can be used and how methods should be combined in order to deal most effectively with the future of a specific aspect of society and/or education. This result led to the development of a concept of "method strings" which is discussed at length in Appendix A.

B. The Study of Contextual Mapping

Briefly stated, the results of this study were as follows:

1. The contextual map was derived from and lends itself to the combined use of a variety of other useful methods. It therefore provided a demonstration of the usefulness of the concept of method strings.

2. Because of the way in which the causal and logical dependencies were developed, the content sequences of the map portrayed conjectures about the future that could be defended as being reasonable and responsible.

3. The contextual map was shown to have potential advantages for educational policy making in the following areas:

a. Providing a systems-oriented display.

b. Providing support for the determination of wants.

c. Making explicit in a public context the analysis of trends.

d. Familiarizing policy makers with trends.

e. Providing a common frame of reference as a basis for public debate on policy issues.

f. Supporting interdisciplinary team operations.

g. Providing for the identification and conduct of research problems, simulation and gaming as part of the training of educators and others.

h. Assisting in the formulation of criteria by which professional futurists may become credentialed.

C. The Survey of Mathematical Models

A full discussion of the findings of this survey is given in Appendix C. The findings having particular reference to the functions of an operational center suggest the following center roles:

1. The development of new models or improved models specifically for educational planning.

2. The improvement of models in the course of their implementation, with special emphasis on delineating relationships between policy decisions and the variables of the model.

3. The implementation of computerized models with the objectives of (a) planning for the future, (b) supporting users in their planning activities, and (c) providing familiarity with models and training experience in the implementation of models to users of the center.

4. The provision of support to agencies that wish to implement educational planning models.

D. The Study of Educational "Wants"

This project was in the nature of a pilot study and the following findings are therefore considered to be tentative only:

1. Even when talking ostensibly about longer-range futures (twenty to thirty years), most attendees at meetings were unable to imagine a world situation fundamentally different from the present. The effective range of their speculations regarding the real world was actually about five to ten years.

2. Verbally describing a hypothetical longer-range future world at a meeting was insufficient to overcome this inability among attendees.

3. Unstructured discussions about future education tend to drift toward present problems and immediate solutions.

4. While bringing together people who represent different groups in the population tended to expose their differences of opinion and thus raise issues, it did not fully expose group attitudes or shared points of view. In heterogeneous groups, the firmness with which a position was stated tended to be proportional to the personal forcefulness and persuasiveness of the individual spokesman rather than to the strength of conviction of the constituency he represented.

5. All attendees agreed (or at least did not disagree) that one of their primary wants is for truly individualized education.

6. Everyone present could name characteristics of the present educational system that a future system should not have, but not one person presented a coherent description of a future educational system along with the characteristics it should have. Thus, there seemed to be no systematically formulated clusters of wants from which one could project one or more "ideal" concepts of an educational system for the future.

7. There was general recognition of the conflict between the need to educate each individual as a whole, self-fulfilling person and the need to educate him as a member of a highly organized, technological society.

E. The Study of Future Educator Roles

The results of this study can be briefly summarized:

1. The construction and use of a contextual map to derive possible future roles of educators resulted in the identification of 98 different roles and, as a by-product, the identification of 101 potential educational issues. The extrapolation of trends on the map and the review of the available literature dealing with possible future roles of educators suggested that the emergence of new roles does not follow merely a process of fragmentation into more specialized subroles. A perspective of twenty years into the future suggests that some roles may acquire new and different functions rather than become more specialized.

2. Three organizational concepts evolved out of construction of the contextual map and review of the literature dealing with future roles of educators. They provide a basis for organizing a future educational environment in which future role concepts are meaningful. They are:

a. The concept of the learning environment as a "real-time" facility.

b. The concept of the continuous, vertical, learning organization serving all educational levels.

c. The concept of the learning environment as a multi-purpose facility.

A fourth concept which was derived logically from the three organizational concepts above is the major conclusion of this study:

d. The concept of the generic role of the learning facilitator as a counselor, engineer, instructor in the use of learning resources, and researcher.

These four concepts are not "forecasts" of the future. They are conclusions derived from extrapolations of current trends. They suggest what might be. These concepts are offered to stimulate thought, to stretch the imagination, and to present an alternative viewpoint. They represent a conjecture about the future of education which is consistent with what we have reason to believe the world may be like twenty years from now.

3. Based on the results of this study described above, three recommendations are made:

a. It is recommended that the U.S. Office of Education support a comprehensive effort involving contextual map construction, perhaps as one of the funded projects of the operational centers recently established for the study of the future by the Office.

b. To prevent an evolutionary form of drift in the future development of education in which technology "calls the tune," it is recommended that the U.S. Office of Education consider establishing or encouraging others to establish a prototype, experimental, test-bed educational institution which would be designed with the above four suggested concepts as the basic building blocks.

c. It is further recommended that institutions responsible for educating educators take seriously the implications for their own planning of the incipient emergence of new roles, such as those derived from this preliminary study. If they do not do so, they will bear whatever culpability accrues for failing their students by not preparing them for the variety of contingencies they may have to face. Moreover, they will be at fault for perpetuating the refractoriness to change that results in a system when its people cannot comfortably assume new roles.

F. The Development of Semiautomated Data Bases

The findings of this project were essentially concerned with the feasibility of employing computers in the development of data bases useful to the work of the proposed operational centers. They can be summarized as follows:

1. The operation and use of a Bibliography data base using the LUCID program, and the feasibility of creating a Methods data base similar in format, were demonstrated.

2. The necessary forms and procedures for the creation of these data bases were designed and tested.

3. It was established that computerized data bases can permit prompt retrieval of the kind of information needed in connection with such projects as contextual mapping.

4. It was shown that through suitable linking between the Bibliography and Methods data bases, new information regarding forecasting methods relevant to educational planning and policy making can be secured.

G. Experiments in Interaction

The general findings that emerged from the many efforts to establish contacts with individual agencies, organizations and persons may be summarized as follows:

1. Visits, correspondence and interviews with possible center users, participants and contributors reinforced original convictions that an operational center should not be an island of research, but should be selectively responsive to the needs of various agencies of the federal government, state

legislatures, state boards and departments of education, local schools, and other people and institutions concerned with the making or influencing of educational policy.

2. There is a widespread interest by educators, policy makers and others in the future as it may affect or be affected by educational policy. The interest and concern arise from numerous problems of great importance and immediacy at all levels of the educational system. It was found that concerned organizations and individuals were eager to take part in the dialogues instituted by the center; that the demand was greater than the center could satisfy within its resources.

IV. DISCUSSION

From the inception of the SDC Center for Educational Policy Research, the staff held the view that although much of the active work of the Pilot Center would be concerned with the specific problem of forecasting possible social and educational futures, the main point of the effort should not be the securing of answers to this particular problem, but rather the development of a way to deal with a wide variety of such problems. During the nine months in which the Pilot Center operated, the core staff and the Consulting Panel used the experience gained to develop an approach to organized studies of the future. Particular forecasts were not deemed to be as important as determining ways to pose questions, and checking forecast validity was not as important as establishing forecast significance.

The various members of the core staff brought to this task widely different training and experience. They worked on a variety of studies and experiments, sometimes independently, sometimes in concert as an interdisciplinary team. The various results were not thoroughly interrelated and, in most cases, due to lack of time, could not be definitive. Yet the staff as a whole acquired from its experiences and interactions a set of perceptions that led to the emergence of a group point of view regarding what a Center for Educational Policy Research should do, and how it should do it.

Hence, the significant outcome of the work of the Pilot Center was not the substantive findings of individual projects, but a philosophy that could guide a much broader and more sustained attack on the problems surrounding educational policy. It is this philosophy, the resultant of all other activities, that most merits detailed discussion.

The group reached the conclusion that a prime purpose of the policy research center program of the USOE should be to facilitate the improvement of education in relation to other social processes and individual concerns by attention to the institutional and policy framework within which educational practice, theory, and research occur. "Policy" in education may be defined for this purpose as the set of official doctrines, decisions, and constraints that determine the character of some aspect of education. Policy may involve goals and objectives; it may involve rules; it may involve resources; it may involve structure and organization; it may involve any of a number of other matters.

The establishment of operational educational policy research centers by the federal government should be a genuine innovation, not merely the creation of two additional research foci in the complex field of education. The interest of these centers should not be primarily education today, as is that of the Regional Laboratories, nor education as it may be in the future, as is the focus of the Research and Development Centers. Their interest should center on two crucial relationships:

1. That between education and other vital concerns of the individual and society.

2. That between contemporary education-related policies, plans and commitments, and future consequences or conditions.

This is not a trivial distinction. It places the policy research centers at a point of great stress and unique challenge. They will not be strictly the business of educators, but they will have the utmost relevance to educators. Their work should be based on a substantial appreciation of the structure of education as a social process, but not be bound by that structure as it presently exists. They should operate in that uncomfortable zone where the conflicting interests of diverse organizations and groups meet and must be resolved.

Thus, aside from designing such a center as an independent functional unit, one must also design it as an element in a complex network of organizations. That is why the operational center design challenge was conceived to be one not merely of arranging to facilitate research on policy questions, but one of complex process-building.

In view of the foregoing, it is worthwhile to consider what it is believed a Center for Educational Policy Research should not be.

First, it should not be a foothold from which a single philosophy of education is espoused with the tacit sanction of the federal government. Education, like many of the other vital processes of this society, is not and cannot be a parochial matter; and there is no single point of view, no matter how well developed, that can be allowed to dominate the entire scene. It is precisely against such a danger that the advocates of local control are always attempting to protect the "system."

Second, an educational policy research center should not be a place where means for instruction or individual development are generated, examined and evaluated for effectiveness, nor is it a place where the group process or any other specific educational device can be turned into actionable form. These are the functions of the R&D Centers and of the Regional Laboratories, as well as of many universities, experimental schools, laboratory schools and demonstration schools throughout the country.

Third, it should not be simply a forum, or conference center to which people interested in education, or expert in education, can come to discuss what the future will hold; nor should it be just the editorial seat of a new professional or popular journal, although these perhaps might be included among its activities.

Fourth, it should not be just a statistical center that develops projections of supply and demand for workers of various categories and for educational facilities of various kinds, although this kind of information is clearly important to the making of educational policy.

Fifth, it should not be a center of educational technology where the newest educational techniques are developed or demonstrated.

Sixth, it should not be a group of scholars thinking about new trends in education--only now with explicit federal support. It should not be an "island of research," nor an environment that is intended to produce occasional intellectual tours de force, although if they emerge, so much the better.

Seventh, it should not be a clearinghouse for educational information--that is the function of the ERIC clearinghouses.

What a center should be is not as easily determined, precisely because one of the purposes of the center--partly as a consequence of the lack of adequate precedent--must be to discover what it should be as it goes along. A center for educational policy research should have,"designed in," a self-renewing propensity based in part on constructive feedback from the world with which it interacts. While it is tempting to think of a center as being a catalyst in the process of educational development, it is better to use the metaphor of the enzyme which is itself changed by the process in which it participates. For these reasons, the conclusions and recommendations concerning the design and operation of an operational center that are set forth in the following section describe a center which is viewed as the beginning form of a constantly evolving institution.

As a result of the experience gained in pursuing the seven projects reviewed in the previous sections, and of the sustained dialogue carried on among the staff members and between the staff and outside organizations and individuals, the conviction was reached that at least one of the educational policy research centers should address itself initially to four germinative programs:

A. The study of educational issues.

B. The synthesis of alternative futures relevant to education.

C. Methodology and resource development.

D. The design and management of interaction with other organizations and groups.

A. Issues

A program devoted to a study of issues is suggested by the fact that a center should be concerned with the relation between the present and the future to the extent that that relation is relevant to educational policy. One of its prime foci then, should be on salient issues, both current and emerging. The work of the Pilot Center in the areas of contextual mapping and educational wants served to identify a long list of such issues. The issues uncovered, as described in this report, are clearly of uneven importance and scope. Hence, since attention cannot be paid to all of them at once, a set of priorities should be determined by the operational center's staff, probably in concert with the U.S. Office of Education.

Statements of issues may be deceiving. Issues are not only "perceived" but are "formulated" and even "created" by people. How they are formulated may bias attitudes toward them. A great deal of importance therefore attaches to who does the formulating, and by what means.

Issue priority determination and issue formulation are both complex and demanding. With the limited resources available, effort should not be wasted on pseudo-issues, or minor issues, or issues on which the best that can be done is not good enough.

Emphasis should be placed on both issue formulation and priority determination in order to enable the efforts of the center to remain continually focused on important matters. "Instant redirection" should normally not be called for. Commitments to programs should be made carefully, and should be expected to last for a while. In this, the judgments of specialists will be needed, but so will the judgments of generalists.

B. Alternative Futures

Basic to the work of an operational policy research center should be a program directed toward the synthesis and analysis of alternative futures. This is based on the idea that informed conjecture about how possible futures are connected to available options will help responsible people to formulate educational--and related--policy today and tomorrow in order to bring about a more desirable society the day after tomorrow. Hence, a major function of the center should be to provide increasingly well-contrived, useful, adequate and provocative conjectures about the future to make the task of planning for education more concrete, comprehensive and well-informed than it has ever been. This task will demand an elusive combination of imagination and systematization. It will also be one of the most exciting human adventures of our time, partly because of the dangers inherent in it.

The primary job in this part of the program should be to generate alternative concepts of the future in such a fashion that they are commonly usable and/or debatable, draw upon whatever data are available, indicate clearly where new data are needed, and, above all, provide a rich source of inference about important aspects of the future of education. Several of these general requirements can be met by paying particular attention to the following:

1. Explicating the assumptions underlying the choice of social sectors and social phenomena to be examined.

2. Referring to sources of data for each concept or trend offered.

3. Attempting to make clear the progression of thoughts and steps that constitute the inferential process used.

Experience in studying the forecasting state of the art, contextual mapping, educational wants, and mathematical models suggests that such attempts initially may meet with only incomplete success. An operational center must, during the course of its existence, upgrade its ability to "futurize" by improving in at least the above three areas.

C. Methodology and Resource Development

In connection with the program for developing methodologies and resources, it is considered that, as welcome as occasional individual tours de force may be, fostering them should not be the primary business of an operational center. The job of improving education-related policy development and educational planning--on a continuing basis--is a most difficult one. The experience gained by carrying on all of the Pilot Center's seven projects suggests that if it is to be done well, it requires interdisciplinary teamwork, and a base of methods and other resources that amounts to a kind of intellectual capital with which to work. To do its own job, as well as to facilitate and inform the work of others, the center will have to make a significant and continuing investment in developing methodology and informational resources.

D. Interaction Design and Management

Finally, a program to develop and manage interaction between the operational center and other institutions and people is needed because, whatever the functions and program of the center, it is important to find ways of amplifying its capability through appropriate relations with outside organizations. Moreover, because educational policy making is a distributed function, the work of the center will be effective to the extent it can produce involvement of those individuals and organizations having roles in policy development. The experience gained by the Pilot Center in establishing a program of interactions and in canvassing educational wants indicates that mediating the needed relationships is so complex a task that it calls for a continuing effort in design, maintenance and management.

In addition to dissemination, which should be one of its major elements, this program should also contain activities concerned with center self-correction and renewal, training and personnel development, subcontract and collateral work and the integration of the work of the center with related outside programs so that there is a mutual reinforcement.

V. CONCLUSIONS AND RECOMMENDATIONS

To realize the philosophy and the programs discussed above will require the formation of a suitable organization and the execution of specific activities. The purpose of this section is to describe an organizational framework for such an organization, and to delineate the program of activities that it should accomplish. The conclusions and recommendations which are outlined here apply to an operational educational policy research center that is expected to change and evolve in response to new and changing requirements over a period of time. Thus they reflect a beginning rather than a permanent state in the life of the proposed center.

A. Organization

There is no adequate precedent for the organizational structure or the work of an operational policy research center for education. While it is true that individual scholars have been interested in aspects of educational policy issues, and even that organizations (e.g., the Eight-State Project) have assembled some of the ideas of these scholars, there has been no concerted, systematic, persistent, interdisciplinary attack on the matter on any appreciable scale. No adequate intellectual "capital" has been accumulated, no satisfactory set of methods and techniques exists, no qualified set of professionals has become committed to a programmatic approach to formulating, analyzing, clarifying, interpreting, and helping to resolve the implied issues.

Present organizational patterns of "policy research" do not constitute adequate models for the work of an operational center. Policy research in the military field, where much of the experience has been accrued, is aimed at an organization that is centralized, hierarchically ordered, unilaterally responsible for all aspects of the work in which it is involved, and accustomed to working with contractors on a continuing basis. It is also an almost exclusively executive function.

In the area of nonmilitary international security affairs the situation is similar, although there is a larger legislative component and a somewhat more restricted experience of contractor operations. In the third area where policy research tends to be concentrated (i.e., economics) the role of the federal government is comparatively well understood--mechanisms for exerting influence exist and experience with them is not lacking. Quantitative indicators of "system performance" have been developed, and mathematical models of many of the phenomena of interest are available for use.

By contrast, education is a distributed enterprise, subject to direct control of both legislative and executive bodies at various levels, constitutionally reserved as a responsibility of the states, but influenced directly and indirectly by federal policy and programs. Its objectives and criteria for performance are neither clear nor unequivocal, and it comes so close to the daily lives of individual citizens that it is of concern to almost all of them.

It takes a visible bite from property owners in the form of local taxes, so that while they may be in favor of improving it, they may also be in favor of economizing on it. And in some real sense it cannot--as can defense, say--be largely delegated to a cadre of expert professionals free from the detailed control of the populace, for in education, since everyone has been to school, almost anyone may feel informed and competent to judge. There are other characteristics that distinguish education from other fields in which "policy research" is being done, and it seems reasonable to expect that a somewhat unique institutionalization of the process is in order.

The social change to which the policy research program of the Office of Education is addressed is a subtle and distributed process, and therefore will require the participation of a broad base of individuals and organizations for its accomplishment. The process is so complex and its scope is of such magnitude that it cannot be achieved unilaterally by any single organization, no matter how competent. This makes it necessary to link the center effectively with a variety of organizations and individuals with capabilities, interests, and constituencies that can effectively expand and amplify the resources of the center itself.

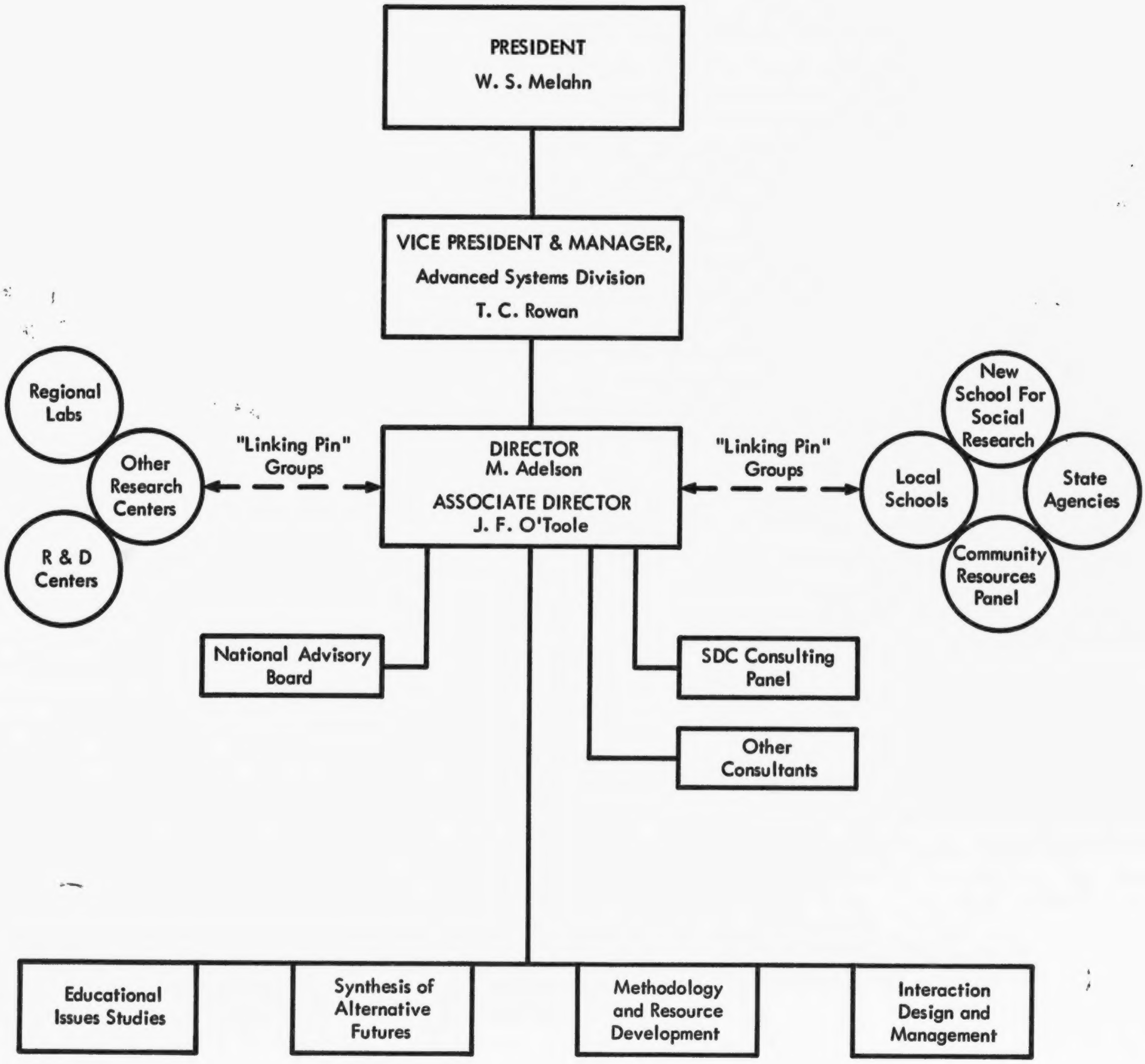
This goal can be achieved only if at least one of the operational centers provides the means for calling upon the resources of all other possible sources of relevant capability as they apply to its work. This implies a management capability; it also implies a willingness to recognize the managerial challenge of the task, and to enter into a relationship with the Office of Education that will eventually meet the emerging needs.

A proposed structure for this kind of operational policy research center is shown in Figure 2.

1. Consultants

During the operation of the SDC Pilot Center, a six-man consulting panel of senior scientists supplemented the interdisciplinary core staff of five professionals representing the fields of education, psychology, anthropology, computer technology, and business management. Our experience with the panel more than justifies continuance of such an arrangement in the operational center, since useful suggestions for direction of the project were received from the group on several occasions during the pilot studies. Several of these consultants prepared position papers and critiques during the pilot phase. However, in the operational center, a regular rotation of consultants on an annual basis should be instituted to allow for self-renewal of the center's structure and for representation of different disciplines.

During the pilot phase, it was also found desirable to use non-SDC consultants such as Olaf Helmer of the RAND Corporation and Charles Carey of the UCLA Institute of Government and Public Affairs, who assisted on the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"Linking Pin" Groups
Regional Labs
Other Research Centers
R & D Centers
New School For Social Research
Local Schools
State Agencies
Community Resources Panel
National Advisory Board
SDC Consulting Panel
Other Consultants
Educational Issues Studies
Synthesis of Alternative Futures
Methodology and Resource Development
Interaction Design and Management

FIGURE 2. OPERATIONAL CENTER PROGRAM ORGANIZATION

exploratory study of what various segments of society desire for education in the future. It is considered essential for the operational center to set aside a limited percentage of the total annual budget for special consultants over and above those provided by the panel of senior professionals belonging to the parent organization.

A panel similar to the SDC Community Resources Panel, which can provide information, guidance, and insights into the policy making process, should be associated with the center. This panel is shown in Figure 3 as one "linking pin" organization among a number of other groups. The "linking pin" concept is an arrangement that has proved very effective in promoting productive interactions using key individuals who represent larger, selected constituencies.

2. Advisory Board

A National Advisory Board should provide a means for center self-renewal. It should be composed of people who not only bring their own relevant experience and outstanding accomplishments to the policy making process, but who can represent the views of important groups of prospective users of, contributors to, and participants in, the center's program. Because the operational center's task is complex and largely unprecedented, the overall guidance and direction such a board can provide is important. This board should operate fairly simply. Tenure should be one year, renewable once, with staggered terms. The doctrine of completed staff work should be used; position papers, proposed guidelines, and personnel and operating policies should be prepared by the Director of the center for presentation to the board. The members should then be asked to review these critically and intensively, and suggest whatever additions or changes are deemed necessary. The papers, guidelines and policy statements should then be revised accordingly. Informal reports to the board should be made periodically. These reports should include the results of studies, interactions with user groups, and plans for future activities.

This board should meet twice the first year and probably at least twice each year thereafter. Although it is admittedly desirable to have more than two meetings per year, it is probably not too practical, since the board members' full-time professional responsibilities would tend to preclude more frequent meetings. However, informal exchanges should take place more frequently between the center's staff and individual members of the board. Meetings of the board should be addressed to the broader aspects of the center's overall program, and should be organized to consider possible new members on the board, semiannual evaluation of the center's accomplishments and dissemination program, possible changes in its structure and operation, and overall guidance and direction.

3. "Linking Pin" Concept

Figure 3 illustrates in more detail the "linking pin" management concept proposed for the operational center that only partially appeared earlier in Figure 2. It represents a way of amplifying the center's capabilities through the establishment of a network of appropriate relationships with outside organizations. Moreover, as stated earlier, since educational policy is a distributed function, the work of the center will only be effective to the extent that it can produce active involvement of those individuals and organizations having roles in policy development. During the SDC Pilot Center operation, these considerations led to the establishment of working relationships with a number of organizations and the setting up of the beginning of a system of linking pins, creating channels to and from additional resources, capabilities, and interests in the future of education. This permitted the Pilot Center to transcend significantly its own capabilities and resources in the accomplishment of its objectives.

The network should include several kinds of substantive capabilities in the linking organizations, with training and experience that cut across professional boundaries. For example, RAND, Brookings, and the Hudson Institute represent relevant experience and capabilities to accomplish portions of the policy research program on a national basis. The New School for Social Research, which cosponsored with the Pilot Center a conference on "Education for the Future," could provide an expanded and amplified capability for accomplishing the center's program on a national scale. The ERIC Clearinghouses, Research and Development Centers, Regional Laboratories, Title III Supplementary Centers, and other Office of Education-sponsored programs offer long-term programmatic capabilities and resources that could be used by the policy research center to strengthen its overall programs. Industry and labor groups also have much to offer the policy research program, and professional or community organizations already in existence might well be used to develop strong working relationships. As a case in point, the Northern and Southern California Industry-Education Councils, both nonprofit corporations, have been organized to bring the resources of both industry and the community to bear directly on school needs. Professional educational associations, such as the American Educational Research Association, the American Association of School Administrators, the Department of Audiovisual Instruction of the National Education Asscoiation, the Educational Policies Commission of the National Education Association, and all the other departments of the NEA obviously could make major contributions to the center's program and they should be encouraged to participate actively. Other relevant policy centers, private and government research and development agnecies, local schools, state agencies (Eight-State Project, Education Commission of the States, etc.), student and teacher groups, and others should also play important parts in the "linking pin" network. The operational center should draw heavily upon these constituencies in carrying on its substantive studies and in contributing to its dissemination activities.

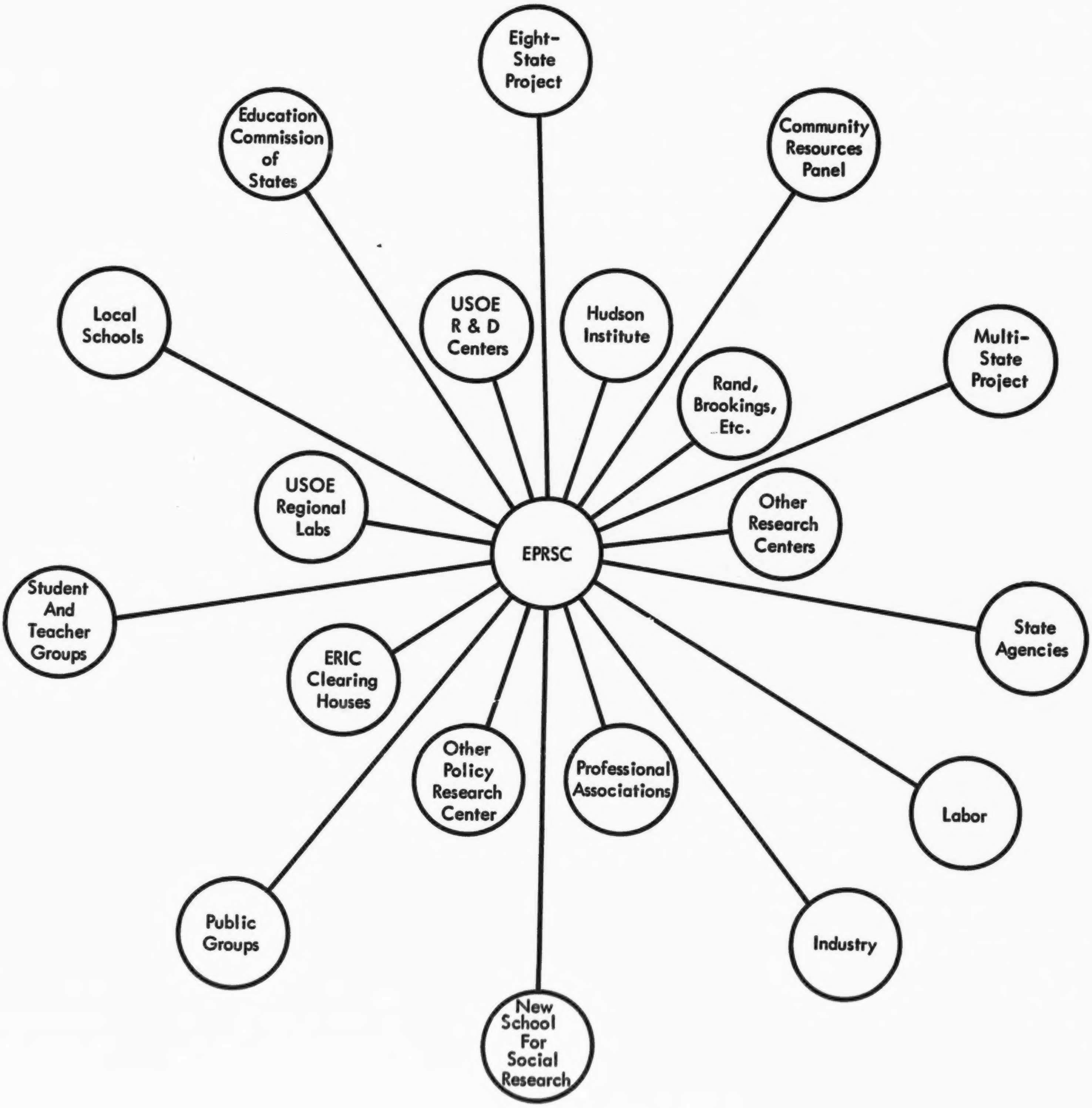
Eight-State Project
Education Commission of States
Community Resources Panel
Local Schools
USOE R & D Centers
Hudson Institute
Multi-State Project
Rand, Brookings, Etc.
USOE Regional Labs
EPRSC
Other Research Centers
Student And Teacher Groups
State Agencies
ERIC Clearing Houses
Other Policy Research Center
Professional Associations
Labor
Public Groups
Industry
New School For Social Research

FIGURE 3. "LINKING PIN" MANAGEMENT CONCEPT

4. Relations with Other Programs

"Program balance" is an apt description of the goal to be achieved by the operational center in collaborating in various ways with other institutions and programs sponsored by the Office of Education. Cooperative relationships with local, regional, state and national agencies and institutions will allow all available resources to be drawn upon for the accomplishment of the center's objectives and avoid unnecessary duplication of capabilibities and efforts. The relations to be sought must be symbiotic ones that strengthen the center, but benefit the other organizations involved as well. In order for these groups to test their constructs and objectives against the models and forecasts evolved by the center, and for the center to obtain needed information and reactions, personnel from many groups should be invited to collaborate by providing critiques, resources and time to discuss the evolution of the center in a continuous, two-way dialogue.

If one were to characterize briefly possible time orientations of relevant Office of Education programs in dealing with events from present to future, the following might be observed: (a) the ERIC Clearinghouses are "past-to-present"-oriented and might be designated as the recorders, custodians and disseminators of educational experiences that have already taken place and are currently in progress; (b) the school is very much concerned with the "present," and the Supplementary Educational Centers are directed toward helping local schools solve immediate problems utilizing innovative approaches; (c) the Regional Educational Laboratories are "today-and-tomorrow"-oriented and are designed to translate research findings into improved practice through demonstrations and disseminations of new tools and curriculum materials that will help the school solve current operational problems; (d) the Research and Development Centers conduct basic and applied research in order to enlarge our knowledge of the learning process and the social setting for learning and education. In this respect, then, they have a "present-to-future" orientation.

The Educational Policy Research Center, among its other activities, should be evolving models of hypothetical schools, systems, and settings of tomorrow, and should be showing how they relate to today's and tomorrow's policies, plans, and decisions. The results of these efforts should therefore complement and enrich the efforts of all the other programs.

B. Program

As discussed in the previous section, it was concluded by the Pilot Center staff that at least one of the operational centers should undertake four specific programs. The following recommendations set forth the activities required to accomplish these programs.

1. Activities Related to the Study of Educational Issues

The operational center should maintain a conscious awareness and a comprehensive catalogue of educational issues appearing in the literature and in public dialogue. It should make known through appropriate communications its interest in statements of issues so as to set up a direct line of communication to and from interested groups. It should invite individuals to elaborate on partially developed statements of issues they have made. It should use other channels (to be established under subsection 4 below) to assure a steady currency on contemporary issues.

The center, however, should not remain passive with respect to issues, merely accepting the formulations of others. Since one of the purposes of the policy research center program of the USOE presumably is to transform the dialogue on issues from the purely verbal level to a level at which operational consequences are clear, that part of the staff assigned to the Issues Probe should be responsible for providing formulations and reformulations that have research and action implications, so that additional work can be done. The members of the staff, as well as consultant and advisory groups, should be encouraged to contribute to the repertoire of issues being actively considered at any time, and suggest deletions from, or substitutions to the repertoire, based on their own work and their own thinking. Attention should be given to arranging for the interplay of interests and disciplines, so that the resulting formulations will be as rich and interesting as possible.

In general, consensus on major issues cannot be expected, so that resolving the inevitable differences will itself turn out to be a serious intellectual and operational issue. In this, a close and well-designed working relationship among the center staff, the USOE staff, the center's National Advisory Board, and other relevant groups and organizations will be essential.

It is in this area that the proposed 40-30-30 pattern of decision-authority on research studies to be conducted by the center may come into play. It should be agreed upon in advance that even if direction is imposed from outside the center, it should be consistent with the general character of the center. That is, the foreshortening of time horizons, which frequently dominates the priorities of operating organizations, should not be allowed to divert the attention and efforts of the center staff from its principal mission.

The purpose of understanding and ordering issues in priority is to direct the activities of the center--and to enable other organizations to direct their own efforts--along important pathways. Program implications of priority issues will have to be determined and appropriate programs developed. For example, if the issue of investment in compensatory education versus investment in general educational development is a priority issue at both federal and state levels, the work and debate already occurring on it elsewhere would have to be augmented by a careful examination of the longer-term consequences of the major alternatives. Intermediate strategies could be sought, and the implications for preparation of educators, educational plant design, labor market planning, and other related matters explored.

2. Activities Related to the Synthesis and Analysis of Alternative Futures

The elements of the task of synthesizing alternative futures should include:

a. Analysis and clarification of trends.

b. Consideration of nontrend factors and contingencies.

c. Sensitivity to "wants."

d. Synthesis of trends and nontrend factors (exploratory forecasts with wants (normative forecasts).

e. Progressive discernment and use of principles.

f. The use of wisdom and judgment.

The center should maintain an ongoing examination of relevant trends and projections. Numerous organizations are in the business of analyzing trends and making projections in matters of (usually indirect) relevance to the concerns of the center and its constituency. The center should therefore initiate and maintain a survey of sources of such trends, analyses, and projections, and use their work as appropriate, integrating and interpreting it, and making it meaningful to educational planners and policy makers. Where relevant components are missing, the center either should make the needed trend analyses and projections itself, or should arrange for them to be made by other organizations. In any case, the center should make known from time to time its perception of the kinds of trend data that are needed and not available, so that organizations that can generate the data, or can sponsor work to generate them, can take appropriate action.

In the past, for technical reasons, the alternatives that could be seriously considered had to be limited by some sort of very constraining "heuristic." Most frequently, aggregative trend curves have been used for this purpose, with attention going to "most probable" alternatives. Recently, more sophisticated models have been devloped. But these approaches are generally based on the idea that major changes will not occur abruptly. However, the most surprising future would be one in which there were no surprises. It is therefore important to identify among the trends those that might inflect or shift suddenly. It is also important to identify factors that might produce discontinuities in future trends, and try to treat these systematically. Two among these are "opportunities"--technological, economic and political; and relevant "wants"--the aspirations, values and preferences of people, groups, and organizations.

Hence, the operational center could commence an examination of nontrend factors with an examination of technologically generated opportunities, building on work already done.

In the past there has been some inequity in the attention paid to the desires of different groups in educational planning. Presumably it is one of the important functions of an operational center to become and remain sensitive to relevant wants, not necessarily in order to be responsive to them, but at least to take them into account in considering the range of future possibilities. An important aspect of this activity should be to provide groups that otherwise have no effective voice, an opportunity to be heard. Thus, links should be established with relevant groups, and constant communication maintained. A variety of media should be used to make and keep contact. Meetings should be held with selected groups. Simulations should be designed to confront people with hypothetical situations requiring choices, so that they may provide clues to what they want by what they choose. Much more importantly, they may learn through simulation what can reasonably be wanted, as they might not in any other way.

In connection with the synthesis of exploratory and normative forecasts, what is needed is some way of superimposing the two differently arrived-at futures so that a kind of resultant can be obtained that would, in effect, point towards the more interesting elements of the particular future being examined.

For the most part, the concepts of desired future that the Pilot Center investigated had to do with objectives, goals or end-states, but there is no reason for an operational center to limit its thinking to end-states. It should also be creating innovative means, methods or paths. There can be an advantage to examining first, means that appear to hold promise for achieving a number of different objectives, and matching their characteristics to the requirements of the respective goals. It should be one of the tasks of an educational policy research center to exploit this advantage.

It is essential to know about trends, nontrend factors, and "wants" in developing ideas of future possibilities, but they may not be enough. They are the empirical part of forecasting, but there is a theoretical part that does not appear explicitly in them. As effort is focused on the future in a programmatic way, it should be possible to develop principles and "heuristics" that will provide guidance where data fail. At first, these may be "weak," in the sense that they don't constrain one's considerations very much. Later, they should grow "stronger," helping to show what is important or what is likely. It should be part of the longer term task of the center to develop such principles.

In the use of wisdom and judgment no startling breakthrough can be expected. The center should try for both by attracting the best staff members it can to become involved in an exciting, creative, excellent, operating center.

3. Activities Related to Methodology and Resource Development

As previously noted, a center, if it is to do its own job as well as to facilitate and inform the work of others, will have to make a continuing investment in developing methodology and information resources. The experience of the SDC Pilot Center's staff indicates that the activities required to sustain this kind of a program should embrace at least the following areas of concern:

a. Tools and techniques
b. Mathematical and analytic models
c. Simulation and gaming
d. Information systems
e. Information services

a. Tools and Techniques

The field of policy research and support generally must be recognized as being in a rudimentary state of development. Even those methods that are available have not been very broadly applied, and as yet they are clearly of limited help in planning. If the work of the center is to make a significant contribution to the field and stay in demand, the center must create new tools and techniques or show how existing ones may be used in more powerful ways.

One area where further refinement is needed is in the application of Delphi-like (delphic) techniques to generating a systematic understanding of usable consensuses and systematic dissensuses that signal incipient issues and problems. These techniques represent a means for systematically tapping expert or other specified kinds of individual judgments, and for having the judgments affect one another without the inconveniences and sociological artifacts of personal confrontation. As valuable as confrontation may be for some purposes, it is not always a good way to discover an individual's independent views or to weigh his judgment of other's reasons for differing with him. While delphic methods have been successfully used, they need to be developed much further.

Pilot Center work on forecasting methods has shown that available tools and techniques can readily be improved and transformed for application in education. This work is only a start, however. One direction in which it needs to be carried is toward evaluation of different method combinations or "strings" designed to satisfy different purposes.

Another tool that is badly needed is an approach to assessing the prospective effect of wants on trends. This does not seem to be an area in which progress will be made immediately, but it belongs on the agenda for eventual work. The operational center should also expect to develop new ideas for tool and technique development as it attempts to apply what has been developed to its other programs.

b. Mathematical and Analytic Models

The internal dynamics of the field of education--student and teacher flows, the influence of expenditures on performance, and other relationships--and the dynamics of its interactions with other fields--manpower, economics, science and technology, international affairs, etc.--must be better understood, and must be represented in usable form more explicitly. This is what is meant by stressing the need for development of mathematical models.

One role for the center should be the development of new models for educational planning. A second role should be the improvement of models, with special emphasis on delineating relationships between policy decisions and the variables of the model. A third role should be the implementation of computerized models with the following objectives: (a) to assist the center in its planning for the future, (b) to support users in their planning activities, and (c) to provide familiarity with models and training experience in the implementation of models for users of the center. A fourth role should be to provide support to agencies that wish to implement educational planning models. One form such support could take is the establishment of a well-documented library of existing models. A depository of programs of models that have been implemented would serve to eliminate considerable duplication of effort.

As a modest beginning, two tasks could be started during the first year: (a) the implementation of a demographic model for a local or regional jurisdiction that would assist the educational policy makers of that jurisdiction and would also serve as a powerful training tool for planners and future users of models, and (b) the establishment of a library of adequately documented programs for educational planning models for use by those who need to use models but cannot develop their own.

c. Simulation and Gaming

There is no substitute for good judgment; it is a process that defies analysis. But people can be assisted in learning and exercising good judgment. It can be developed through the nondestructive, vicarious experience acquired through simulation and games. The term "simulation" can cover a variety of activities. Here we refer to the artificial creation of a life-like slice of the social milieu that contains realistic problems for actual people to solve. In pursuit of solutions to the problems raised, the people interact with each other and with the environment, and may collect and use whatever data the designers have made provisions for. One advantage of simulated over real experience is that time can be compressed artificially. Simulating the environment will allow the planners or policy analysts to look at the (hypothetical) consequences of their actions within minutes, hours, or days; rather than months, years, or decades; and thus to have many chances to explore alternatives and to learn.

Experience indicates that simulation is not only a beneficial didactic device, but when done properly is one of the most successful means for involving people emotionally in the complexities of a particular milieu and for giving them a "feeling for the real thing."

Several germinal ideas for relatively simple simulations have been presented by members of the Eight-State Project. These include:

1) Resizing the local unit (school district).

2) Developing specialty production centers (curricula for mass media).

3) Directed funding (boosting programmatic efforts).

There is no reason to assume that initial simulation attempts need to be computerized. Manual simulation is relatively inexpensive, yet requires most of the same formulation steps (stopping short of the actual computer program designs) and lacks the most complex interactions. Should a decision be made to convert after the manual efforts meet with success, the center can then exploit, with a subsequent saving, the semiautomated data bases that will exist and some of the general-purpose computer programs that are already available to help process the data.

Games are distinguished from simulations in that two or more individuals or groups of people actually compete for valued objectives. Games are somewhat easier to construct and operate than simulations, which explains their greater prevalence. The center might well employ a game such as one that pits state educational planning boards against those of the large municipalities, where the conflict is over any of a number of scarce resources, and where both competition and cooperation are called for by the situation. This would serve two functions: training, and the development of potentially usable tactics.

d. Information Systems

The requirement for information systems is based on the need to develop means to input, store, selectively retrieve, and display a large variety and quantity of information that is useful in educational policy and planning activities. The center should develop the mechanisms which will make using the information attractive to policy analysts. Discrete information systems can be developed for each policy analysis agency if necessary.

e. Information Services

A number of auxiliary information services can be used meaningfully in the major work of the center. They grow naturally out of the search for data to support policy analysis and could be offered for general use without much trouble. One such service should be the creation of a bibliographic data base that would identify different types of treatment of the subject matter. That is, it would distinguish science fiction, personal viewpoints and expert opinion from hard data obtained by research. It could be used to access either those relatively scarce citations from which hard data can be extracted, or those that supply stimulating provocative opinion. A subject matter thesaurus should be developed to allow the user to choose the degree of specificity of subject matter he wants. The Pilot Center demonstrated that such a bibliography can be automated and can work successfully in a time-sharing system.

Another service should be based on the creation of an automated methods data base of methods for futurizing to provide a repertoire from which policy analysts and other futurists can select methods to suit their needs.

One of the aspects of policy analysis needing systematic treatment is the availability of resources to carry out potential programs for the improvement of education. The center should provide information on such matters as agencies that sponsor certain kinds of innovational programs in education, or legislation relevant to particular interests. Such data would be of use to a state planning agency or to a local district, and could be made available in just the same fashion as the "bibliography" for use by any concerned agency.

4. Activities Related to the Design and Management of Interaction

Sufficient detail has been provided in an earlier part of this section about the way in which an operational policy research center should be organized to indicate the extent to which it should be involved in interactions with outside institutions and individuals. Most of the activities related to such interactions will, of course, depend on the interests of other groups, circumstances, and opportunities. The dissemination of center outputs, however, merits particular attention. If the policy research program is to be effective in improving the process of policy making and long-range planning at all levels of education, the center's program must be widely publicized.

In addition to the activities described in connection with other programs--particularly the application of the linking pin concept and the provision of information services--the following specific projects are recommended:

a. The development of a university-level course on the "Future and its Implications for Education." Such a course would probably be well received by the academic community, laymen, state and local educators, legislators, students, and other groups. The course should be designed for general use in colleges and universities, and might be taught initially by members of the operational center's staff.

b. The establishment of reciprocal internship arrangements for staffs of the center, the Office of Education, state departments of education, and local school systems. Preliminary discussions of this idea with state department of education planners evoked considerable enthusiasm for the concept, since many of them have little or no background in systems analysis, planning methods, or the literature pertaining to the future. By exchanging staff positions for a period of perhaps three to six months at the local, state, and federal levels, the center's staff should be able to develop new insights and a clearer picture of the policy making process at various educational levels--thus effecting a self-renewal feature that is important for the continuing professional growth of the staff. The opportunity for responsible educational officials to spend time at the center and to become actively involved in its program should expand their own insights and knowledge of the policy research process, and equip them with useful skills to carry away when they leave. Internships should also be made available to selected students of colleges and universities.

c. The development of futuristic scenarios, policy issue games, and simulated group decision processes that can be viewed via a national network of educational television stations. Mass audiences could play an important role in the policy making process. Television broadcasts of public affairs programs are now being used to obtain almost immediate audience response. These techniques could be used to poll audience reactions to policy questions in education, "future preferences," and related matters. Such use of communications technology would make possible the determination in "real time" of what different sectors and levels of the community want for education in the future on a national scale. It would also help to focus attention on the work of the operational center.

d. The sponsoring of an annual national student essay contest on education in the future. College and university students should be invited to enter the contest by submitting an essay on "What Should Education be Like in the Year 2000?" The prize could be a modest sum of money and the opportunity to spend either a summer vacation as an intern staff member at the center, or upon graduation, a three- to six-month period. Distinguished judges should be selected to represent the public, education, and futurists. After a trial period, if successful as a dissemination activity, the program might be extended to include high school seniors. The essay contest not only should attract national attention to the center's work, but also should provide a useful means for obtaining a wide variety of student opinions about education that would be valuable to the center's staff.

e. The production and dissemination of an integrated communications program involving periodical publications, static and traveling exhibits, video-taped briefings, conferences, and extensive news media coverage.

The foregoing recommendations describe the organization and activities of an operational center for Educational Policy Research whose structure and programs are capable of changing with the changing needs of those responsible for the determination of policy, whether directly or indirectly affecting education. They are based on a relatively short but intensive attempt to create such a center. They are thus supported by a medium of practical experience and some perception of what is needed and possible.

VI. SUMMARY

The Pilot Center for Educational Policy Research operated by the System Development Corporation commenced its activities on June 1, 1967 and continued through February 29, 1968. During this period, seven projects were undertaken, each covering a different subject related to education, the future and policy making. The projects were as follows:

A. Survey and Evaluation of the Forecasting State of the Art

This survey first developed working definitions for the ideas of "method" and "forecast." Twenty-one methods for conjecturing about the future and for contributing to the attainment of a desired future were then identified and defined. Each of these methods was evaluated in terms of its potential for the support of each of seven operational center functions and for its utility in supporting all these functions. This investigation revealed that while the evaluation of individual methods is important, a heretofore neglected problem is to determine how methods can be combined in order to deal most effectively with the future of a specific aspect of society or of education. This result led to the development of a concept of "method strings" (see Appendix A).

B. The Study of Contextual Mapping

This study grew out of the survey discussed above. The purpose of a contextual map is to show the logical and causal dependencies of functionally related phenomena. The map developed by the Pilot Center was a wall display 98 inches wide by 150 inches high in the form of a two-dimensional matrix divided into 36 cells. The matrix had six rows which were labelled to correspond to major trends generated by the Hudson Institute, and six columns designating: major subtrends, social and technical implications, implications for education, educational functions, possible future roles for educators, and major educational issues. (The selection of trends identified by the Hudson Institute was primarily a matter of convenience; other trends could have been used instead.)

This contextual map demonstrated the usefulness of the concept of "method strings," it portrayed conjectures about the future that could be defended as being reasonable and responsible, and it showed that it could provide nine potential advantages when used in support of educational policy making (see Appendices A and B).

C. The Survey of Mathematical Models

The purpose of this survey was to describe and, to some extent, evaluate some of the computer programmed models that have been used for educational planning. Consideration was given to models developed in the United States, Great Britain, the Netherlands, France, Norway, Sweden, Australia, Spain, Turkey and Greece. In all, some eighteen models were identified and described. As a result of the survey, four functional roles for an operational center were suggested (see Appendix C).

D. The Study of Educational "Wants"

The objectives of this study were to (a) experiment with methods for ascertaining group educational "wants," (b) ascertain what selected groups within the United States want from future educational programs, (c) examine the extent to which the several groups agree or disagree with respect to what they want, and (d) expose potential issues raised by the impacts of these wants upon current trends affecting education. Four meetings with different groups (policy makers and educators, representatives of the black community, human factors and training professionals, and futurists, writers and educators) were held; threee in California, one in New York. This study, a preliminary exploration of the field, employed the "linking pin" concept and included use of a Delphi-like technique. It resulted in four suggestions for improvements in future efforts of this kind and indicated three areas about which the public appears to be acutely aware (see Appendix D).

E. The Study of Future Educator Roles

The conduct of this study was one of the three primary pursuits of the Pilot Center. Its objective was to forecast possible roles in education in 1988 for teachers, counselors and administrators, and to introduce consideration of possible new educational functions involving new varieties of educators. The method employed was contextual mapping using three sequential steps: (a) extrapolation of selected aspects of the major long-term trends in Western civilization, (b) the logical derivation from the extrapolated trends of basic concepts which would serve as organizing principles for a possible future learning environment, and (c) the logical derivation of the possible roles of educators which would be compatible with the future learning environment. The study resulted in the identification of 98 different educator roles and, as a by-product, the identification of 101 potential educational issues. It suggested that some roles may in the future acquire new and different functions rather than become more specialized. Three organizational concepts evolved out of the study:

1. The concept of the learning environment as a real-time facility.

2. The concept of the continuous, vertical, learning organization serving all educational levels.

3. The concept of the learning environment as a multipurpose facility.

A fourth concept which was derived logically from the above was the major conclusion of the study:

4. The concept of the generic role of the learning facilitator as a counselor, engineer, instructor in the use of learning resources, and researcher.

On the basis of this study, it is recommended that the U.S. Office of Education support a comprehensive effort involving contextual map construction and that it also consider establishing or encouraging others to establish a prototype, experimental, test-bed educational institution which would be designed with the above four concepts as the basic building blocks.

It is further recommended that institutions responsible for educating educators take seriously the implications for their own planning of the incipient emergence of new roles, such as those derived from this preliminary study. If they do not do so, they will bear whatever culpability accrues for failing their students by not preparing them for the variety of contingencies they may have to face. Moreover, they will be at fault for perpetuating the refractoriness to change that results in a system when its people cannot comfortably assume new roles.

F. The Development of Semiautomated Data Bases

The purpose of this project was to develop a "Bibliography" data base and a "Methods" data base using computer programs designed to operate on a time-sharing system. Procedures and forms were worked out and the feasibility of creating and using such data bases was demonstrated. It was also shown that through suitable linking of the Bibliography and Methods data bases considerable new information regarding forecasting methods relevant to educational planning and policy making can be secured (see Appendix F).

G. Experiments in Interaction

These experiments were instituted and maintained as a reflection of the philosophy of the Pilot Center's staff. In accordance with this philosophy, very extensive efforts were made to inform interested agencies, organizations, and individuals of the work of the center through the medium of visits, meetings and correspondence. Parallel efforts were designed to involve institutions and individuals in the work of the center by soliciting their advice and comment, by encouraging visitors to the Pilot Center's facilities, and by encouraging the submission of papers reflecting outside viewpoints (see Appendices H and I). The experiments reinforced the staff's original convictions that an operational center should not be an "island of research" but should be responsive to all those concerned with the making or influencing of educational policy. The experiments also established that there is a widespread interest in and concern with the future by educators, policy makers and others as it may affect or be affected by educational policy.

The results produced by these projects were not thoroughly integrated and, in most cases could not be definitive due to lack of time. Out of the aggregation of the experiences gained, however, the staff as a whole acquired a set of perceptions that led to the emergence of a group point of view regarding what a center for Educational Policy Research should do and how it should do it. Hence the significant outcome of the work of the Pilot Center was not the findings of individual projects, but a philosophy that could guide a much broader and more sustained attack on the problems surrounding educational policy. This philosophy led to the conclusion that recommendations covering the organization and program of an operational center should describe the beginning form of a constantly evolving institution.

It also led to the conviction that at least one of the Educational Policy Research centers should address itself initially to four germinative programs:

1. The study of educational issues.
2. The synthesis of alternative futures relevant to education.
3. Methodology and resource development.
4. The design and management of interaction.

To pursue these programs, an organization is recommended that includes a center staff organized into four divisions under a Director and an Associate Director, a National Advisory Board, a Consulting Panel of senior professionals from the sponsoring organization, and a group of special consultants. To ensure that the center will be responsive to outside needs and will take full advantage of outside capabilities, it is recommended that strong emphasis be placed on the "linking pin" concept under which continuing interaction with concerned institutions and individuals in the community at large will be maintained.

Finally, sets of specific activities are recommended to give effect to each of the four proposed center programs.

In sum, the recommendations describe an operational center for Educational Policy Research whose structure and programs are capable of changing with changing needs. They are supported by the practical experience gained through operating a Pilot Center and the resulting perception of what is needed and possible.

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